

REMARKS

Claims 1-3 and 8-11 are pending in the application. Claims 4-7 and 12-17 previously were cancelled. Claims 1-3 are allowed but claims 8-11 are rejected. Consistent with the following remarks, claim 8 is cancelled and new claims 18-23 are added.

As a preliminary matter, Applicants wish to thank the Examiner for the courtesy extended to the Applicants' representatives at an interview conducted on May 12, 2004. A summary of the discussions held at the interview is being submitted herewith.

The Applicants also wish to thank the Examiner for withdrawing both his previous objection to the specification and the double patenting rejection. Further, Applicants wish to thank the Examiner for reconsidering the rejection based on the "recapture rule" and for advising Applicants' representative of the Examiner's conclusions prior to the interview, so that significant expenses related to travel of other individuals, who were concerned with that issue, could be avoided.

Finally, Applicants' are also appreciative of the Examiner's exemplary responsiveness, cooperation and professionalism during the examination process.

Claim Rejections - Recapture of Inventions: 35 U.S.C. § 251

Claims 8-11 are rejected under 35 U.S.C. § 251 as being an improper recapture of broadened claimed subject matter surrendered in the application for patent upon which the present reissue application is based, as set forth at pages 28-32 of the Office Action. This rejection has been withdrawn by the Examiner in an Interview Summary (paper 13) sent by the Examiner via facsimile on May 6, 2004. The Examiner also has confirmed this withdrawal in the Interview Summary (Paper 14) faxed to the Applicants' representative on May 12, 2004 and subsequently mailed to the Applicants' representative by the USPTO.

The basis for the withdrawal is the application of new Guidelines concerning the issue of recapture, as stated in paper 13. The Examiner noted that the limitation related to the "wherein said selecting step" clause formed the basis for allowance of the claims. The Examiner

concluded that the arguments presented to the Patent File Examiner pertaining to subject matter other than the added subject matter were not convincing to the Examiner and that it was the added subject matter alone that resulted in allowance. The Examiner notes that in reissue claim 8, the claim is broader in aspects not related to the added subject matter. Further, the added subject matter that caused the allowance is retained in broadened form. The Examiner concludes that "recapture is not barred in this situation."

Moreover, given the cancellation of claim 8, this rejection is moot. Nonetheless, the logic of the Examiner's analysis applies equally to new independent claims 18, 19 and 23, and these claims should be free of any taint of recapture, as already concluded by the Examiner in the Interview Summary (Paper 14).

Specifically, the modifications to the language of original claim 8 that appear in claims 18 and 19, which change the term "zig-zag" to "predetermined" would fall within the permitted amendments under the Guidelines, according to the Examiner's analysis. Thus, there should be no issue of recapture with respect to the claims. The correction of a grammatical error also does not raise a recapture issue. The other aspects of new claims 18 and 19 are modifications of presently pending claim 8 and fall within the permitted amendments under the Guidelines, according to the Examiner's analysis. Thus, there should be no issue of recapture with respect to these claims. New claims 20-22 are duplicates of claims 9-11, except they depend from claim 19.

With regard to new claim 23, it also changes the term "zig-zag" to "predetermined" and specifies certain of the "plurality of variable-length coding tables." The claim also specifies that the selecting step is according to "intra/inter mode information and a scanning position," a change that deletes reference to "quantization step size." However, "quantization step size" is recited with respect to a "table selectable for a direct-current (DC) component" and, in particular, selection of variable length codes that are "further selectable according to said DC component that has been quantized by a quantization step size." None of these changes involves recapture.

Claim Rejections - 35 U.S.C. § 102

The Examiner has rejected claim 8 as being anticipated by *Kato* (5,559,557). This rejection is traversed for at least the following reasons.

First, the rejection is rendered moot by the Applicants' cancellation of the claim without prejudice or disclaimer, in an effort to promptly obtain allowance of the present application without giving up the right to pursue the subject matter of claim 8 in a divisional application. Nonetheless, Applicants wish to make the following comments for the record.

Retraction of Arguments to Traverse §102/103 Rejection
in the Response dated September 2, 2003

As a preliminary matter, Applicants hereby retract all arguments presented in its Response dated September 2, 2003 to traverse the Examiner's § 102 and 103 rejections, without prejudice or disclaimer. For at least the following reason, Applicants' previous § 102/103 arguments are retracted, and therefore should not be considered for patentability or defining the scope of the outstanding claims or claims to have had in the future, or for what *Kato* discloses and/or suggests. That is, Applicants mistakenly combined and described aspects of *Kato* with one or more aspects of the instant invention. For example, the statement "In particular, referring to Figure 15 of the present invention, S18 corresponds to a quantization step size for an AC component" is incorrect in so much as that the "reference S18" and "Figure 15" refer to aspects of *Kato* and not of the instant invention, while "quantization step size" refers to an aspect of the instant invention. Accordingly, instead of separating and identifying which aspects belong to where, replacement arguments are presented below to traverse the § 102/103 rejections. That is, Applicants submit that *Kato* does not disclose or suggest each and every element of the claims now pending before the Examiner.

The Examiner's Basis for Rejection Under §102 Rejection in view of *Kato*

The Examiner's analysis in support of the rejection of claim 8, which appears at pages 33-36 of the outstanding Office Action, takes several positions with regard to limitations that

appear in the claim. With regard to the recitation of “setting a plurality of variable length coding tables,” the Examiner points to tables in block 704 (for DC and AC coefficients) and block 707 (for DC coefficients - particularly luminance and chrominance in tables 9B and 9C, respectively). The Examiner also asserts that the selecting according to “intra/inter mode information” is met by the operation of block 709 in setting switch 710, the selecting according to “scanning position” is met by block 703 as basis for selecting block 704 for AC coefficients and block 705 for DC coefficients so that tables 9B or 9C are selected. Finally, with regard to the “quantization step size” criterion, the Examiner points to the operation of the modifier 706 to control storage 707 based on code S26, representing a quantization step size.

Traversal of the Outstanding §102 Rejection in view of *Kato*

Applicants respectfully submit that *Kato* does not disclose or suggest each and every limitation as recited in claim 8 (now cancelled) or claims 9-11 and 18-23, as required by MPEP § 2131 for a proper § 102 rejection. In particular, Applicants submit that *Kato* does not teach or suggest the existence of a table in VLC 704 (Fig.17). Moreover, Applicants wish to comment on certain interpretations of *Kato* that have been taken by the Examiner, so that a clear understanding of the reference is available to the Examiner when passing on the allowability of all of the claims currently pending in this case.

Contrary to the Examiner’s stated belief, one of FIG. 9B and FIG. 9C (or one of FIG. 21A and FIG. 21B) of *Kato* is not selected based on a required precision, quantization step width, CTL signal or quantization step size. Rather, as the Examiner at one point cited, whether one table is used as opposed to another is dependent on whether a block being encoded is a luminance Y block or a chrominance Cb/Cr block. (See column 21, lines 42-48 and column 22, lines 7-15.)

Contrary to the Examiner’s stated belief, one of FIG. 9B and FIG. 21A (or one of FIG. 9C and FIG. 21B) of *Kato* is not selected based on a required precision, quantization step width, CTL signal or quantization step size. Rather, (FIGS. 21A and 21B) are used instead of (FIGS. 9B and 9C) where added precision is desired. That is, *Kato* discloses using tables of FIGS 9B

and 9C instead of the prior art tables of FIGS. 6B and 6C for added precision. As noted by *Kato*, the “tables in FIGS. 9A-9C corresponds to the tables in FIGS. 6A-6C extended to include 9, 10 and 11 bit encoding for additional precision,” as the prior art tables only provide for up to 8 bit encoding. (See column 8, lines 20-26, and compare FIGS. 6A-6C with FIGS. 9A-9C.) Similarly, *Kato* discloses using tables of FIGS. 21A and 21B instead of the tables of FIGS. 9B and 9C for 12, 13...M bit encoding. (See column 4, lines 48-52, column 28, lines 41-52, and compare FIGS. 9B and 9C with FIGS. 21A and 21B.) In other words, for example, one of FIG. 9B and FIG. 21A is not selected based on a required precision, as *Kato* does not disclose having both of the tables. Rather, *Kato* discloses that the table of FIG. 9B may be expended to include 12, 13...M bit encoding, resulting in a table of FIG. 21A to be provided and used instead of the table of FIG. 9B. That is, in another embodiment where up to M bit precision is desired, a table of FIG. 21A is provided and all selection is made form the table of FIG. 21A for luminance. Note that the table of FIG. 21A includes all of the information of the table of FIG. 9B.

Contrary to the Examiner’s stated belief, the modifier 706 of FIG. 17 does not modify the tables of the storage 707, or select, for example, one of FIG. 9B and FIG. 21A (or one of FIG. 9B and FIG. 9C) based on a required precision, quantization step width, CTL signal or quantization step size. Rather, the modifier 706, for example, “functions to control the storage 707, based on intra_dc_precision code S26, to supply only a required portion of the table shown in FIG. 9A to the variable length decoder 705.” (See column 21, lines 56-65. Emphasis added by the Applicants.) While the modifier 706 may control the storage 707 to supply the entire table shown in FIG. 9A or to supply the table shown in FIG. 9B where a flag indicates a luminance block, *Kato* does not disclose or suggest selecting, for example, one of FIG. 9B and FIG. 21A. (See column 21, line 66 to column 22, line 16.)

Claim Rejections - 35 U.S.C. § 103

Claims 9 and 10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of *Kato* (5,559,557) and *Kaneko et al* (4,908,862). This rejection is traversed for at least the following reasons.

The Examiner admits that *Kato* does not disclose the variable coding tables as having different patterns of a regular and an escaped region. Based upon a broad interpretation of the terms “regular” and “escape” as set forth in pages 36 and 37 of the Office Action, the Examiner concludes that *Kaneko* teaches such feature and that it would have been obvious at the time of the invention to modify the code sets (i.e., tables) of *Kato* by providing different patterns for regular and escape regions as taught by *Kaneko* in order to provide high efficiency of encoding as set forth by *Kaneko* at column 12, lines 8-12.

The claims should be patentable for the reasons given with respect to new claim 18. from which they now depend. *Kaneko et al* does not remedy the deficiencies of *Kato*.

Claim 11 is rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of *Kato* and *Kaneko et al* as applied to claim 9 and further in view of *Jung* (UK 2,267,410 A). This rejection is traversed for at least the following reasons.

The Examiner admits that the combination of *Kato* and *Kaneko* does not teach the data of the escape region of the variable length coding table selected in the variable coding step being “coded” into data having variable run length and level length.” The Examiner looks to *Jung* for such teaching, particularly, at page 8, lines 10-11 and pages 4 and 5. The Examiner concludes it would have been obvious at the time of the invention to code the data of *Kato* and *Kaneko* escape region into data having variable run length and level length as taught by *Jung* in order to reduce the number of bits. This assertion is set forth at pages 38 and 39 of the Office Action.

Applicants respectfully submit that § 103 rejections should be withdrawn as neither *Kaneko* nor *Jung* can remedy the deficiencies of *Kato* described above.

New Claims

Claims 18 and 19

New independent claims 18 and 19 represent a variation of claim 8 and define the invention in a manner that clearly distinguishes over the prior art. As a preliminary matter, Applicants note that the claims use “predetermined” rather than “zig-zag.” In distinguishing

over *Kato* and the remaining art, the new claims focus on specifying the content of the claimed tables, specifically, a table selectable for an AC component of an intra mode that is different from a table that is selectable for an inter mode and a table selected for a DC component of the intra mode. Applicants respectfully submit that *Kato* fails to disclose or suggest at least “a table selectable for an AC component of an intra mode that is different from a table selectable for an inter mode,” as recited in claims 18 and 19.

As already noted with reference to FIG. 17, *Kato* appears to use a variable length code in a VLC 704 for non-intra picture encoding S706. That same variable length code in the VLC 704 is used for an AC component of intra picture encoding S708. *Kato* does not specifically state that it uses a table in the VLC 704. Even assuming that use of a variable length code refers to use of a table, *Kato*’s use of such “table” in VLC 704 would be for both non-intra picture encoding S706 and an AC component of intra picture encoding S708. (See FIGS. 17 and 19, column 21, lines 12-33.) No more than a single table could be assumed. In such case, the Examiner’s comment at page 34 of the Office Action that block 704 discloses “a table” would be proper, but there is no basis for his assertion at page 35 that there is a disclosure of “tables.” Applicants submit that *Kato* does not disclose or suggest “tables” for block 704. There is no mention in the specification of tables, as there is for block 707, which is accessible by block 705.

Applicants respectfully note that new claims 18 and 19 also recite “a table selectable for an AC component of an intra mode that is different from a table selectable for an inter mode” aspect, and therefore, are allowable.

In the Interview Summary (Paper 14), the Examiner also has agreed that *Kato* does not anticipate either claim (previously presented as new claims 12 and 13 and now renumbered in consideration of previously cancelled claims) and that the two claims avoid the recapture rejection.

Claims 9-11 and 20-22

Claims 9-11 have been amended so that they depend from claim 18. New claims 20-22, which have the same body as claims 9-11, respectively, have been added so that they depend from claim 19.

Claim 23

Applicants respectfully submit that *Kato* does not disclose or suggest each and every limitation as recited in claim 23 and required by MPEP § 2131 for proper § 102 rejection. That is, *Kato* fails to disclose or suggest at least “a table selectable for an AC component of an intra mode that is different from a table selectable for an inter mode” aspect of claim 23. Moreover, *Kato* does not teach the specifically recited tables and criteria for selecting variable length codes, as now recited in claim 23. Finally, neither *Kaneko* nor *Jung* remedy the deficiency of *Kato*, as described previously.

Applicants also respectfully submit that no new matter has been added, and that new claim 23 is fully supported by the specification as originally filed. The following analysis describes the detailed support in the original specification, as would be understood by one skilled in the art, for the content of claim 23. In any event, Applicants submit that the specification need not disclose in detail every aspects of the invention, so long as one skilled in the art can discern the aspects without undue experimentation. Thus, with respect to the features of the claim, Applicants submit as follows:

Table for DC Component

The claim recites “said table for said DC component comprising variable-length codes further selectable according to said DC component that has been quantized by a quantization step size.” This aspect is supported as follows:

i) The “table comprises variable-length codes” aspect is supported at least by the disclosures of column 3, lines 34-35, column 5, lines 57-60, column 6, lines 8-11, and FIGS. 1 and 5, and is inherent from the Applicants’ teachings as a whole. Such an aspect was further

noted by the Examiner during the Examiner Interview on May 12, 2004, where the Examiner presented a Huffman code table 8.4 (source © 1993 ITU-T) and asserted that use of the Huffman table for coding inherently calls for the use of codes from the Huffman table. From the above cited portions of the specification, Applicants note that “quantized DCT coefficients...are variable-length coded in accordance with the selected variable-length coding table” (column 5, lines 57-60), that the “‘0’ scanning position SP corresponds to the DC component” (column 6, lines 8-11) and that “a Huffman code is used in coding” (column 3, lines 34-35). Accordingly, use of a variable-length coding table, that is a table having variable-length codes in a Huffman coding, for coding a quantized coefficient, is supported by the specification as filed;

ii) The “DC component is quantized by a quantization step size” aspect is supported at least by the disclosures of column 1, lines 27-33, column 3, lines 10-11, column 5, lines 44-46, column 6, lines 8-9, and FIGS. 1 and 5. With reference to FIG. 1, as “the present invention [may be] adopted for a general coding system shown in FIG. 1” (column 5, lines 44-46), Applicants note that “DCT coefficients,” of which “‘0’ scanning position SP corresponds to the DC component” (column 6, lines 8-9), are quantized by a quantizer (12) using a quantization step size (column 1, lines 27-33, column 3, lines 10-11 and the arrow indicating Qss Transmission in FIG. 1); and

iii) The “variable-length codes selectable according to said DC component that has been quantized by said quantization step size” aspect is supported at least by the disclosures of column 1, lines 27-33, column 2, lines 57-60, column 5, lines 57-60, column 6, lines 8-11, and FIGS. 1 and 5, and inherent from the Applicants’ teachings as a whole. That is, the “0” scanning position, which corresponds to a DC component, is variable-length coded in accordance with the selected variable-length coding table having variable-length codes (column 5, lines 57-60, column 6, lines 8-11, and as noted in i) above). In other words, with reference to FIG. 1 and column 1, lines 27-33, a DC component quantized by a quantization step size Qss in the quantizer (12) is coded using a variable-length encoder (13), which according to an embodiment of the present invention, may use a plurality of variable-length coding tables including a

variable-length coding table selectable for said DC component. In particular, Applicants note that “quantization step size Qss has value ranging from “0” to “62”” (column 6, lines 10-11). As such, a variable-length coding table may include a plurality of codes to deal with different component values resulting from different Qss values (column 2, lines 57-60). Accordingly, a DC component quantized according to different Qss values require corresponding codes selected from the variable-length coding table during the variable-length coding. Therefore, a particular code is selected according to a DC component that has been quantized by a particular Qss value. Applicants submit that selecting a particular code for a DC component having a particular value is supported by and inherent from the specification as originally filed.

Selecting At Least According to Intra/Inter Mode Information and Scanning Position

The limitation directed to “selecting one of said plurality of variable-length coding tables at least according to intra/inter mode information and a scanning position” is supported at least by the disclosures of column 5, lines 1-3 and lines 5-10, column 6, lines 12-14 and lines 27-40, and column 7, lines 22-25, and from the Applicants’ teachings as a whole.

i) Applicants disclosed that “a plurality of variable-length tables are provided for...compared to the case of using a conventional single table” (column 7, lines 22-25) as a distinguishable feature, and such a claim has been repeatedly presented during the prosecution of the parent application and the instant pending application;

ii) In the broadest sense, the specification discloses that “[i]n the adoptive variable-length coding method according to the present invention, a plurality of variable-length coding tables are used” (column 5, lines 1-3). Applicants note that claim 23 recites this aspect along with further details of this aspect by reciting “a table selectable for an AC component of an intra mode that is different from a table selectable for an inter mode” aspect;

iii) The specification provides at least one embodiment where a “table is selected in accordance with block type, quantization step size and a current scanning position” (column 5, lines 3-5). That is, “[t]his selection is in accordance with the statistical characteristics...which

vary depending on block type, i.e., intra mode/inter mode or luminance signal/color signal, quantization step size and a current zigzag scanning position” (column 5, lines 5-10, emphasis added by the Applicants). Applicants note that while “luminance/color” is described as a factor for selecting a table, at least one embodiment has been disclosed in detail with respect to use of intra/inter mode, scanning position and quantization step size factors for selecting a table. Applicants note that a disclosure of one embodiment does not foreclose Applicants from claiming other embodiments. That is, while Applicants may have claimed three of the at least four factors in one embodiment, this does not foreclose other embodiments utilizing fewer or more than three factors. For example, Applicants have maintained that selecting one of a plurality of variable-length tables is a novel aspect of the present invention. Where “a table selectable for an AC component of an intra mode that is different from a table selectable for an inter mode” is provided, as claimed in claim 23, selection of one table from such tables may be accomplished at least by considering whether the scanning position is an inter mode or an intra mode, without deference to the quantization step size (column 6, lines 12-14, and see below); and

iv) That is, column 6, lines 27-40 discloses “an example” of how a plurality of variable-length tables may be provided/partitioned according to an intra/inter mode, a scanning position and a quantization step size, as illustrated in FIGS. 6A and 6B. Depending on “various experimental states,” other tables/graphs may be easily derived from FIGS. 6A and 6B. For example:

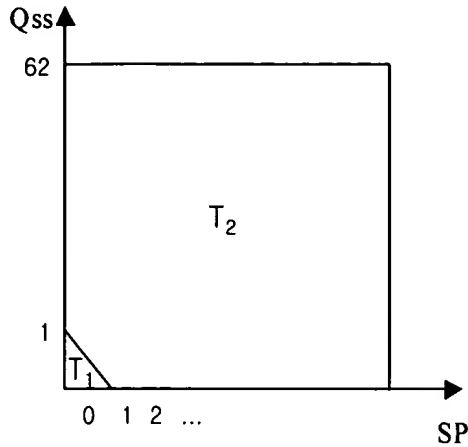


Figure 6C

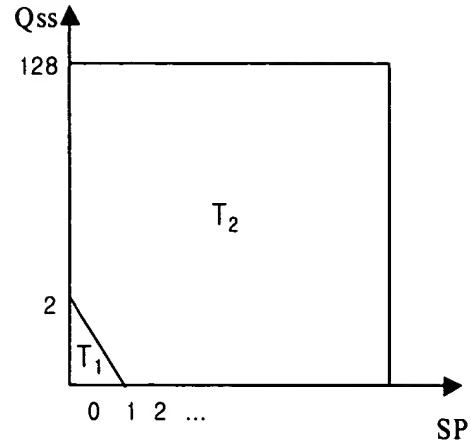


Figure 6D

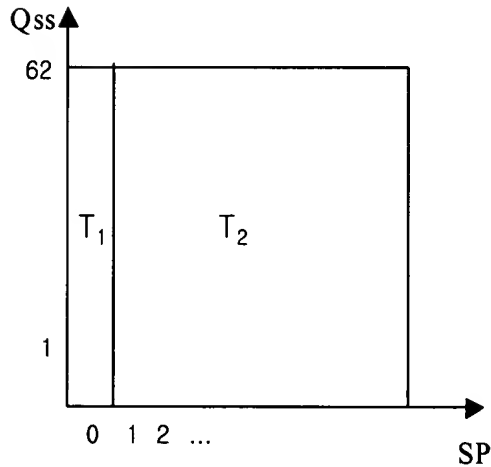


Figure 6E

The figures 6C, 6D and 6E may be easily derived from of FIG. 6A or 6B. That is, where $K1$ and $K2$ are 1 and ∞ , respectively, figure 6C with P tables = 2 is derived from FIG. 6A. Here a table $T1$ exists for a DC component, that is, a DCT coefficient corresponding to SP of 0. FIGS. 6A and 6B are specific examples where a SP - Qss plane is partitioned into P tables according to inter/intra mode, and where Qss , for example, varies 0 to 62. However, the range of Qss can be 0 to 128 for non-linear quantization, while SP varies 0 to 63. Or simply stated in other words, $K1$ and $K2$ for Qss and $K1'$ and $K2'$ for SP that are varied for certain states may result in a partition line of a different slope for tables. In this case, figure 6D with a slope of 2 may be

derived from FIG. 6A, compared to figure 6C with a slope of 1. As another example, K1 and K2 for Qss and K1' and K2' for SP may be varied where the resulting slope may be ∞ . In this case, Figure 6E is derived from FIG. 6A where a table T₁ is used for VLC of a DC coefficient for any Qss and a table T₂ is used for VLC of AC coefficients for any Qss. That is, a table may be selected without deference to the quantization step size Qss. For the convenience of the Examiner, the above figures may be better understood with the following expressions, with $-\alpha$ to indicate the slope of a partition line, which correspond to the expressions of column 6, lines 30-33:

$$\text{Region 1: } SP + \frac{1}{\alpha} \cdot Q_{ss} < K_1$$

$$\text{Region 2: } K_1 \leq SP + \frac{1}{\alpha} \cdot Q_{ss} < K_2$$

...

$$\text{Region P: } K_{P-1} \leq SP + \frac{1}{\alpha} \cdot Q_{ss} < K_P$$

Finally, while new claims 18 -23 have been added to more specifically recite additional unclaimed embodiments of the present invention, Applicants submit that the scope of claim 8 prior to the Amendment and/or any unclaimed embodiments of the present invention are not disclaimed, and may be pursued in one or more Continuing Applications.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Amendment Under 37 C.F.R. § 1.114c
09/654,939

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.


Respectfully submitted,

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE

23373

CUSTOMER NUMBER


Alan J. Kasper
Registration No. 25,426

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